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GEMEINSAMES  
KOLLOQUIUM  
“OPTIMIERUNG UND OPERATIONS RESEARCH”  
DER WIRTSCHAFTS- UND SOZIALWISSENSCHAFTLICHEN FAKULTÄT  
UND DES FACHBEREICHS MATHEMATIK

Im Rahmen des Kolloquiums spricht

**Herr Prof. Dr. Marc Uetz**, Universität Maastricht,

zum Thema

***Scheduling Parallel Jobs with Linear Speedup.***

Der Vortrag findet statt am

**Mittwoch, dem 04. Januar 2006, um 16 Uhr c.t.**

(Tee: 15.45 Uhr) im Raum 614, Mathematikgebäude, 6. Stock.

**Zusammenfassung:**

We consider a scheduling problem where a set of jobs is a-priori distributed over a set of parallel machines. The processing time of any job is dependent on the usage of a scarce renewable resource, e.g. personnel. An amount of  $k$  units of that resource can be allocated to the jobs at any time, and the more of that resource is allocated to a job, the smaller its processing time. The dependence of processing times on the amount of resources is linear for any job. The objective is to find a resource allocation and a schedule that minimizes the makespan. Utilizing an integer quadratic programming relaxation, we show how to obtain a  $(3 + \varepsilon)$ -approximation algorithm for that problem, for any  $\varepsilon > 0$ . This generalizes and improves previous results, respectively. Apart from this result for the scheduling problem, however, the main contribution rather lies on the methodology side: We derive a fully polynomial time approximation scheme to solve the quadratic programming relaxation. This result is interesting in itself, because the underlying quadratic program is a concave quadratic minimization problem, which is NP-hard to solve. We also discuss some further generalizations of the results.

Interessierte Hörerinnen und Hörer sind herzlich willkommen !

Der Vortrag richtet sich auch an Studierende der Mathematik und der Wirtschaftsmathematik mit Vorkenntnissen in Optimierung und/oder Operations Research.

gez. W. Achtziger, P. Recht, M. Skutella